MEDICAL HISTORY

MEDICINE AND SCIENCE IN THE 19TH AND 20TH CENTURIES

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The achievements of 19th century medical education, practice, literature, and science and their affect on 20th century medicine are reviewed. The contributions made by 19th century physicians to change medical education are described, as well as the social processes that influenced medicine and science in both centuries.

Gert H. Brieger, current professor of the history of medicine at Johns Hopkins University, published in 1972 a collection of selected readings from the literature. In his book, *Medical America in the Nineteenth Century,*[1] he extracted information from 19th century lay and medical journals. The book has eight chapters, each with an introduction by Dr. Brieger. These readings represent some of the finest achievments of 19th century physicians; they also reveal concern for American medical education, practice, literature, and the profession.

In 1985 the *Journal of the American Medical Association* Centennial Series was published. Entitled, *Fifty-One Landmark Articles,* each article contained a commentary.[2] This notable collection reflects the essence and spirit of 20th century American medicine and science. With much new terminology, it exhibits the quantitative and qualitative growth of medicine into the 20th century. It provides evidence of new medical conquests in transplantation; transmission of disease in animals; clinical experiments with volunteers; isolation of thyroxine in the laboratory; case reports; pioneer descriptions of new diseases; therapeutic trials; antimicrobial testing; new diagnostic tests; epidemiologic investigations; original surgical procedures; and many other areas of medicine and science. These two volumes do not contain the whole story of American medicine in the 19th and 20th centuries; but they do offer an opportunity for understanding the different movements and motivating forces.

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AMERICAN MEDICINE: 19TH CENTURY

The form of medical education in the 19th century surfaced from the early colonial period. At that time, medicine was not a branch of learning; anyone could set up as "doctor." The apprenticeship method of medical education arose in response to increasing practical needs.[3] John Morgan, having served as an apprentice and having earned a degree at Edinburgh, addressed the College of Philadelphia in 1765. He decried the ignorance, qualifications, and methods of practice of colonial doctors, but his advocacy of a combined apprenticeship and medical school education became a casualty of the Revolution.[4]

Morgan's proposals were adopted in the 19th century, with apprenticeships of three or four years' duration and two terms of three to four months each at a medical school. Students were taught the bewildering theories of William Cullen, John Brown, and

Benjamin Rush. These theories included artificial nosologic schemes and violent depletion therapies.[5] Profitable, proprietary medical schools sprang up everywhere; any applicant who paid his fee was assured of a diploma, no matter how poorly educated or ill-prepared for practice.[6]

Morgan's description of the physician, medical education, and practice prevailed. Hundreds of people became doctors, many of whom were totally unfit to fulfill their duties. There was a great want of respect by a public that was convinced it was better to trust nature than a doctor, and the legislature destroyed every barrier of protection essential to the welfare of the public.[7] Arnold pleaded, "When schools are this way, are we not fallen upon evil days."[8] Welch, appalled by the contrast with European medical schools, cried, "Horrible, no proposals for improvement."[9] Billings wrote, "One-half of these schools have no sufficient reason for existence."[10]

The president of the New York Medical Society stated, "With few exceptions, practitioners are ignorant, degraded and contemptible."[11] The chairman at the first meeting of the newly formed AMA bemoaned, "The profession, once venerated, has become corrupt and degenerate. Many are unworthy of the Association by intellectual culture or moral discipline."[12] Indeed, most graduates were concerned not with the health of patients, but with the means of acquiring fees.[13] A newspaper editor wrote, "In all parts of this country are established medical colleges. Here collect ignorant professors to lecture to ignorant pupils, ignorant blockheads who sail under the name of physicians."[14] Rothstein declared, "No one who has read the comments of the leaders of the profession, or who had perused the truly third-rate journals of the period can avoid feeling astonished at the abysmal ignorance, bizarre practices, and general incompetence of the lower ranks of the profession."[15] The status of medical literature was summed up by Billings in 1876, "Medical literature was not yet a profession in the United States."[16]

In contrast, surgery was held in high esteem. Although mostly self-instructed, surgeons performed ligation of arteries, removed abdominal tumors, treated injuries peculiar to women, and used anesthesia once it became available.[17] In 1809 Ephraim McDowell dared to perform without anesthesia, and on a kitchen table, the removal of a large ovarian mass from a courageous woman.[18] James M. Sims accomplished the first successful operation for vesicovaginal fistula in 1852. He devised a position for the patient that facilitated adequate vaginal expansion with air.[18] R.H. Fitz, a Boston pathologist, described acute pancreatitis and appendicitis (1886). Halsted developed neuroregional anesthesia with cocaine[19]; Valentine Mott performed aneurysm surgery (1818); and J.S. Bobbs removed gallstones (1867).

Eliminating the fears of surgery with ether anesthesia was an historic 19th century event. Crawford Long, of Georgia, when still in his 20s was the first to use ether to remove a skin tumor. William Morton, a young dentist and Harvard medical student, successfully pioneered ether anesthesia for a surgical operation at the Massachusetts General Hospital in 1846.[19]

Scientific investigation, which had barely raised its head, remained limited in the 19th century to clinical observations, collection of facts, and surgery. Faculties and trustees of colleges, lacking money as well as interest, favored law, theology, and the humanities.[20] Billings declared, "The John Hunters and Rudolf Virchows of the United States had not yet given signs of existence."[10] A speaker at the graduation exercises of the Pennsylvania Medical School expressed despair at the lack of interest in investigation (1840).[21] Welch urged teachers of medicine to be investigators capable of imparting enthusiasm to students.[10] Sigerist stated, "Whoever gave up money-making to live for science was considered a crank."[22] Welch, striving for scientific respectability in pathology and bacteriology, was regarded as a "lab man" who was too incompetent to practice. Holmes was ridiculed when he proclaimed the contagiousness of puerperal fever (1843) five years before Semmelweis.[23]

Nonetheless, men without laboratory training made lasting scientific contributions in the 19th century. William Beaumont, a doctor by apprenticeship, isolated gastric juice from the stomach of a man with a fistulous opening, demonstrating its function through the action of hydrochloric acid. J.R. Young of Hagerstown, Maryland, extracted gastric juice from bullfrogs. Daniel Drake pioneered medical education in the Ohio Valley and wrote *Principal Diseases of the Interior Valley of North America* (1830).[18] Many keen, clinical observers enriched clinical medicine, and Huntington's chorea, Koplick's spots, Osler's nodes, McBurney's point, and Flint's murmur became a part of the new medical literature. Cocci-

dioidomycosis was described by E. Redford of California. Typhus and typhoid were differentiated by W.W. Gerhard of Philadelphia (1837); J.C. Otto recognized the hereditary features of hemophilia; John Abel isolated aderenaline; John Leidy discovered the Trichinella spiralis in hogs; and Horner's syndrome was described by S. Weir Mitchell (1864).[24]

Interest in public health and the formation of the American Public Health Association in 1872 was a response to the alarming spread of disease among tenement dwellers.[25]

Where do we place the blame for the denigration of medical education, practice, and science in the 19th century? No doubt, the colonial heritage of medical education, practice, theories, and therapy were social processes, as were the inactivity and lack of interest by university faculties and trustees. Historians, however, point the finger at the credo of unrestrained laissez-faire philosophy that dominated economic thought in the United States during the 19th century. This was a powerful social process that stalled progress in medicine and science, and which extolled money-making and the self-made man. It fostered corruption in both man and government, producing sudden and corrupt wealth, and the acquisition of immense fortunes by a few.[26–29]

AMERICAN MEDICINE: 20TH CENTURY

The social processes in the 20th century that made America progress in medicine and science were the abandonment of a laissez-faire policy; the rapid advancement of industry and manufacturing that stimulated the material growth of America; better prepared and educated students; increased interest in the sciences by university faculties and trustees; and, most important, the response by wealthy donors to the needs of medical schools, hospitals, and research institutes. All the foregoing elements had their roots in the 19th century, made possible by the contributions of the extremely wealthy, who were the beneficiaries of laissez-faire. Bear in mind, some improvements in medical education and training began in the late 19th century, before the Flexner Report of 1910. At the Johns Hopkins Hospital, basic science instruction and a residency program was introduced in 1891. As a result, more attention to both the patient and the laboratory was initiated.[30]

It is interesting that specialization was strongly opposed by William Osler. He declared, "No more dangerous members of our profession exist than those born into it, so to speak, as specialists." Osler believed that, "There are no specialties in medicine, since to know many of the diseases, a man must be familiar with their manifestations in many organs."

SUMMARY

Doctor Brieger's readings reveal the ardent but almost fruitless struggle in the 19th century for the improvement of medical education, the profession, the practice, and the literature. The social process of laissez-faire was primarily responsible. The JAMA Centennial Series constitutes a superb compilation of 20th century medical literature. Its articles reflect the spirit and essence of medicine during this time.

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